VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Major, Municipal permit. The effluent limitations contained in this permit will maintain the Surface Water Quality Standards of 9 VAC 25-260. The proposed discharge will result from the operation of a municipal sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
   Opequon Water Reclamation Facility (OWRF)
   PO Box 43
   Winchester, VA 22604
   Location: 3100 Berryville Pike, Winchester, VA 22603

2. Permit No. VA0065552; Expiration Date: June 30, 2012

3. Owner Contact:
   Name: Mr. Jesse Moffett
   Title: Executive Director; Frederick – Winchester Service Authority
   Telephone No: 540.722.3579

4. Description of Treatment Works Treating Domestic Sewage:
   Total Number of Outfalls – Existing: 1; Proposed: 0

   The Opequon WRF primarily receives sewage wastewater generated by city residents and businesses, with the balance of the flow generated by commercial and industrial contributors (see permit reissuance application Form 2A, Part F). The WRF has an approved Industrial Pretreatment Program for regulating the non-domestic contributors' wastewater quality. The treatment units comprising the recently upgraded STP are shown in the schematics included in the permit reissuance application.

   Current Average Discharge Flow = 7.6 MGD
   Design Average Flow Tier = 12.6 MGD

5. Application Complete Date: August 26, 2010

   Permit Writer: Trevor Wallace Date: February 28, 2011
   Reviewed By: Kate Harrigan Date: December 21, 2010
   Reviewed By: Dawn Jeffries Date: December 21, 2010

   Public Comment Period: March 15, 2011 to April 14, 2011

6. Receiving Stream Name: Opequon Creek
   River Mile: Outfall 001: 32.66
   Use Impairment: Yes
   Special Standards: pH
   Tidal Waters: No
   Watershed Name: VAV – B08R Upper Opequon Creek
   Basin: Potomac; Subbasin: None
   Section: 11; Class: IV

7. Operator License Requirements per 9 VAC 25-31-200.C: Class I

8. Reliability Class per 9 VAC 25-790: Class II (assigned w/ December 2010 Certificate to Operate (CTO))

9. Permit Characterization:
   ☐ Private ☐ Federal ☐ State ☑ POTW ☐ PVOTW
   ☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

10. Discharge Location Description and Receiving Waters Information: Appendix A

11. Antidegradation (AD) Review & Comments per 9 VAC 25-260-30:
    Tier Designation: Opequon Creek: Tier 1

    The State Water Control Board's Water Quality Standards (WQS) includes an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

    The AD review begins with a Tier determination. Opequon Creek downstream of the facility discharge location is determined to be Tier 1 because the stream does not meet the General Standard (Benthics) for aquatic life use. AD baselines are not calculated for Tier 1 waters.

12. Site Inspection: Performed by Trevor Wallace on February 24, 2011

13. Effluent Screening and Effluent Limitations: Appendix B

14. Whole Effluent Toxicity (WET) Program Requirements per 9 VAC 25-31-220.D:
    The WET evaluation conducted during the previous reissuance indicated a WET limit was required for this discharge. Limits were established for the existing and expanded flow tiers at that time. The 12.6 MGD facility WET limit became effective with the December 2010 CTO issuance. At the time of this evaluation there are no WET data for the 12.6 MGD discharge, and the previous limit has been carried forward based on Antibacksliding requirements. Continued quarterly WET monitoring is required in accordance with DEQ guidance memo GM00-2012. See Appendix B for additional details.

15. Management of Sewage Sludge:
    Sludge from this facility is disposed in the Frederick County Regional Landfill in accordance with the Sludge Management Plan that was approved with the permit reissuance application.

16. Bases for Special Conditions: Appendix C

17. Material Storage per 9 VAC 25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

18. Antibacksliding Review per 9 VAC 25-31-220.L: This permit complies with Antibacksliding provisions of the VPDES Permit Regulation.

19. Impaired Use Status Evaluation per 9 VAC 25-31-220.D: Opequon Creek in the vicinity of the discharge is listed as not meeting the General Standard (Benthics) for aquatic life use. This section of river is also listed as having elevated levels of coliform bacteria. A TMDL addressing these impairments includes the following WLAs for this discharge:

    E. coli: 2.12×10^{13} cfu/yr (based on a design flow of 12.2 MGD and a concentration of 126 cfu/100 mL)
    Sediment: 5.0571×10^{5} kg/yr (based on a design flow of 12.2 MGD and a TSS concentration of 30 mg/L)

20. Regulation of Users per 9 VAC 25-31-280.B.9: N/A – This facility is owned by a municipality.

21. Storm Water Management per 9 VAC 25-31-120: Application Required? ☑Yes ☐No
The permittee submitted an updated No Exposure Certification Form with their application that indicates there are no industrial activities or materials exposed to storm water discharged from the property. No Exposure Certification is approved as part of the permit reissuance. No storm water requirements have been included in the permit.

22. Compliance Schedule per 9 VAC 25-31-250: There are no compliance schedules included in the reissued permit.

23. Variances/Alternative Limits or Conditions per 9 VAC 25-31-280.B, 100.J, 100.P, and 100.M: The applicant requested a waiver for sampling Oil & Grease and TDS and EPA Form 2A, Part D parameters. Justification for the waivers is adequate. The permittee is required to sample and test for all current Water Quality Standard (9 VAC 25-260) parameters within one year of issuance of the 12.6 MGD facility CTO.

24. Financial Assurance Applicability per 9 VAC 25: N/A – This facility is owned by a municipality.

25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☑ No

26. Nutrient Trading Regulation per 9 VAC 25-820: See Appendix B
General Permit Required: ☑ Yes ☐ No

27. Threatened and Endangered (T&E) Species Screening per 9 VAC 25-260-20 B.8: DGIF and DCR requested an opportunity to conduct a T&E review at this reissuance. DCR's and DGIF's comment letters were provided to the permittee and are included in the permit processing file. DCR recommended upgrading to UV disinfection if possible and to coordinate with DGIF due the potential presence of the Wood Turtle in Opequon Creek. DGIF commented that if the facility adheres to the effluent limitations and monitoring requirements specified in the permit, they do not anticipate adverse impact.

28. Public Notice Information per 9 VAC 25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Trevor Wallace at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7807, trevor.wallace@deq.virginia.gov.

    Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

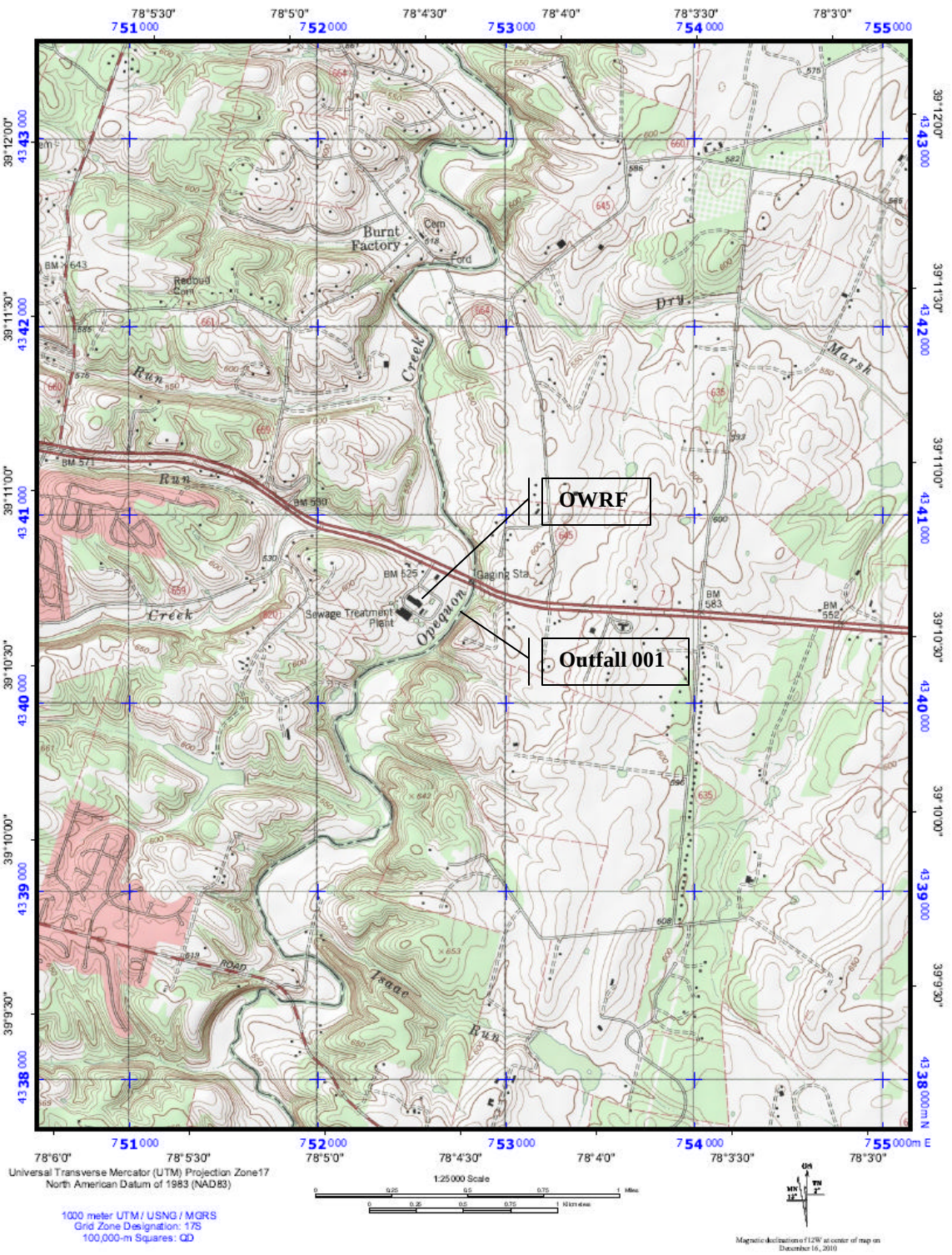
29. Historical Record:

EVENT	DATE
VPDES PERMIT ISSUANCE w/ DAF = 5.0 MGD.	2/7/85
VPDES PERMIT MODIFICATION w/ DAF = 5.0 MGD.	2/11/87
VPDES PERMIT REISSUANCE w/ DAF = 6.25 MGD.	2/11/91
VPDES PERMIT REISSUANCE w/ DAF = 6.25 MGD.	2/1/96
VPDES PERMIT MODIFICATION w/ DAF = 6.25 MGD and an additional flow tier w/ DAF = 8.4 MGD (Jun-Nov), 16.0 MGD (Dec-May)	6/24/97
VPDES PERMIT REISSUACNE w/ DAF = 8.4 MGD (Jun-Nov), 16.0 MGD (Dec-May).	2/11/01
VPDES PERMIT REISSUANCE w/ DAF = 8.4 MGD and Seasonal (Dec-May) Flow Tier of 16.0 MGD. Expanded Flow Tiers w/ DAF = 10.4 MGD & 12.6 MGD.	7/7/2006

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

OWRF discharges to Opequon Creek in Frederick County. The topographical map included below shows the location of the treatment facility and Outfall 001.



PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessment TMDL Review table and corresponding map below.

WATER QUALITY ASSESSMENTS REVIEW
POTOMAC-SHENANDOAH RIVER BASIN
11/9/2010

IMPAIRED SEGMENTS

SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER
B08R-01-BAC	Opequon Creek	57.47	32.66	24.81	E-coli
B09R-01-BAC	Abrams Creek	10.8	0.00	10.8	Fecal Coliform
B09R-03-BAC	Lick Run	8.85	0.00	8.85	E-coli
B09R-02-BAC	Opequon Creek	32.66	23.56	9.1	Fecal Coliform, E-coli
B09R-04-BAC	Redbud Run	8.05	0.00	8.05	Fecal Coliform, E-coli
B07R-01-BAC	Babbs Run	11.46	0.00	11.46	Fecal Coliform
B09R-01-BEN	Abrams Creek	10.8	0.00	10.8	Benthic
B09R-02-BEN	Opequon Creek	32.66	23.56	9.1	Benthic
B09R-04-BEN	Redbud Run	8.05	0.00	8.05	Benthic

PERMITS

PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0065552	**Opequon Water Reclamation Facility**	**Opequon Creek**	**32.66**	**391036**	**0780429**	**VAV-B08R**
VA0051373	National Fruit Product Co Inc	Town Run	1.68	391109	0781021	VAV-B09R
VA0076384	Federal Mogul Friction Products	Abrams Creek	6.7	390953	0781012	VAV-B09R
VA0088722	Stonebrook Racquet and Fitness Club STP	Opequon Creek	50.76	390833	0781330	VAV-B08R
VA0076384	Federal Mogul Friction Products	Abrams Creek X-Trib	6.7	390915	0781011	VAV-B09R

MONITORING STATIONS

STREAM	NAME	RIVER MILE	RECORD	LAT	LONG
Abrams Creek	1AABR000.78	0.78	08/25/76	391043	0780508
Opequon Creek	1AOPE036.13	36.13	07/01/91	390852	0780526
Redbud Run	1ARED000.46	0.46	07/01/91	391113	0780505
Lick Run	1ALIR000.95	0.95	07/01/91	391255	0780502
Opequon Creek	1AOPE038.36	38.36	7/1/97	390713	0780614
Opequon Creek	1AOPE031.26	31.26	7/2003	391136	0780426
Opequon Creek	1AOPE027.30	27.3	7/2003	391328	0780337
Dry Marsh Run	1ADRS000.11	0.11	7/2003	391135	0780409
Opequon Creek	1AOPE029.61	29.61	1984	391215	0780427
Opequon Creek	1AOPE034.53	34.53	1987	390938	0780504

PUBLIC WATER SUPPLY INTAKES

OWNER	STREAM	RIVER MILE
None		

WATER QUALITY MANAGEMENT PLANNING REGULATION

Is this discharge addressed in the WQMP regulation? **Yes**

If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?

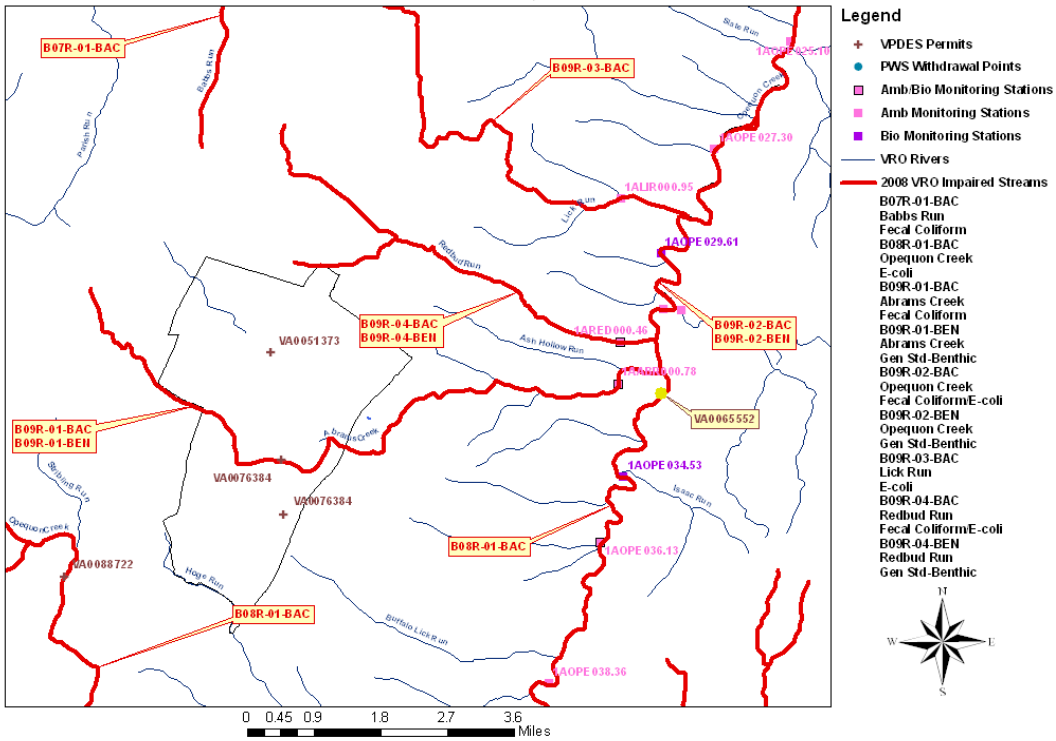
PARAMETER	ALLOCATION	
BOD5	207 kg/d	JUN-NOV
CBOD	1514 kg/d	DEC-MAY

Nutrients Under the General Watershed Permit

WATERSHED NAME

VAV-B08R Upper Opequon Creek

Opequon WRF - Water Quality Assessments Review
Potomac-Shenandoah River Basin
November 9, 2010



Legend

- VPDES Permits
- PWS Withdrawal Points
- Amb/Bio Monitoring Stations
- Amb Monitoring Stations
- Bio Monitoring Stations
- VRO Rivers
- 2008 VRO Impaired Streams

B07R-01-BAC
Babbs Run
Fecal Coliform
B08R-01-BAC
Opequon Creek
E-coli
B09R-01-BAC
Abrams Creek
Fecal Coliform
B09R-01-BEN
Abrams Creek
Gen Std-Benthic
B09R-02-BAC
Opequon Creek
Fecal Coliform/E-coli
B09R-02-BEN
Opequon Creek
Gen Std-Benthic
B09R-03-BAC
Lick Run
E-coli
B09R-04-BAC
Redbud Run
Fecal Coliform/E-coli
B09R-04-BEN
Redbud Run
Gen Std-Benthic

FLOW FREQUENCY DETERMINATION

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
VALLEY REGIONAL OFFICE

4411 Early Road – P.O. Box 3000 Harrisonburg, VA 22801

SUBJECT: Flow Frequency Determination
Opequon Water Reclamation Facility, VPDES Permit No. VA0065552, Frederick County

TO: File

FROM: Trevor Wallace

DATE: November 2, 2010

This memo updates Eric Aschenbach's flow frequency determination dated March 18, 2005.

The Opequon WRF discharges to Opequon Creek near Berryville, Virginia. While the period of record for the reference gage has not changed since the previous memo, some of the previously determined stream flow frequencies are no longer required. This updated memo will be used for developing effluent limitations for the VPDES permit reissuance.

The VDEQ operated a continuous record gage on Opequon Creek near Berryville, Virginia (#01615000) from 1943-1997. The gage is located downstream of the discharge point at the Route 7 bridge in Frederick County, Virginia. In July 1988, approximately 1000 feet upstream of the gage, the Opequon WRF began discharging from a 6.0 MGD facility to Opequon Creek. Therefore, the flow frequencies for the reference gage are based only on the period of record from 1943 to 1988. Since the Parkins Mill WWTF did not begin discharging to Opequon Creek until about September 1989, its flow did not impact the gage during the selected period of record. Due to the proximity of the gage to the Opequon WRF outfall, the values for the gage are applied directly to the discharge point. This analysis does not address any other discharges, withdrawals, or springs that may be located between the gage and the discharge point. The flow frequencies for the reference gage/discharge point are presented below.

Opequon Creek near Berryville, VA (#01615000):

Drainage Area = 58.2 mi^2

1Q10 =	1.1 cfs	(0.71 mgd)	High Flow 1Q10 =	3.1 cfs	(2.00 mgd)
7Q10 =	1.5 cfs	(0.97 mgd)	High Flow 7Q10 =	4.1 cfs	(2.65 mgd)
30Q10 =	2.2 cfs	(1.42 mgd)	High Flow 30Q10 =	6.7 cfs	(4.33 mgd)
30Q5 =	3.1 cfs	(2.00 mgd)	HM =	10.2 cfs	(6.59 mgd)

The high flow months are December through May.

Reviewer: ERM
Concurrence: November 16, 2010

EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

12.6 MGD Annual Mix

Effluent Flow = 12.6 MGD
Stream 7Q10 = 0.97 MGD
Stream 30Q10 = 1.42 MGD
Stream 1Q10 = 0.71 MGD
Stream slope = 0.00114 ft/ft
Stream width = 45 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10
Depth = 1.0306 ft
Length = 1830.03 ft
Velocity = .4529 ft/sec
Residence Time = .0468 days
Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10
Depth = 1.0514 ft
Length = 1798.83 ft
Velocity = .4587 ft/sec
Residence Time = .0454 days
Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10
Depth = 1.0185 ft
Length = 1848.77 ft
Velocity = .4495 ft/sec
Residence Time = 1.1424 hours
Recommendation: A complete mix assumption is appropriate for this situation providing no more than 87.53% of the 1Q10 is used.

12.6 MGD Wet Season Mix

Effluent Flow = 12.6 MGD
Stream 7Q10 = 2.65 MGD
Stream 30Q10 = 4.33 MGD
Stream 1Q10 = 2.00 MGD
Stream slope = 0.00114 ft/ft
Stream width = 47 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10
Depth = 1.077 ft
Length = 1924.49 ft
Velocity = .4664 ft/sec
Residence Time = .0478 days
Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10
Depth = 1.148 ft
Length = 1821.32 ft
Velocity = .4857 ft/sec
Residence Time = .0434 days
Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10
Depth = 1.0487 ft
Length = 1969.12 ft
Velocity = .4585 ft/sec
Residence Time = 1.1929 hours
Recommendation: A complete mix assumption is appropriate for this situation providing no more than 83.83% of the 1Q10 is used.

APPENDIX B

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 001 **Final Limits** **Design Flow: 12.6 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Avg.		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
---	---	Monthly Avg.		Weekly Avg.		---	---
BOD_5 (Jun-Nov)	3,4,5	7 mg/L	207 kg/d	10 mg/L	480 kg/d	3 Days/Week	24 HC
$cBOD_5$ (Dec-May)	2,3,4,5	25 mg/L	1200 kg/d	40 mg/L	1900 kg/d	1/Week	24 HC
TSS	6	29 mg/L	1400 kg/d	44 mg/L	2100 kg/d	1/Month	24 HC
Ammonia-N (Jun-Nov)(mg/L)	3	1.6		2.2		1/Day	24 HC
Ammonia-N (Dec-May)(mg/L)	3	2.9		3.7		1/Day	24 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.0076		0.0081		1/2 Hours	Grab
E. coli (N/100 mL) (geometric mean)	6	122		NA		4/Month* or 1/Day** between 10 am to 4 pm	Grab
---	---	Annual Average		Maximum		---	---
TP – Year to Date (mg/L)	8	NL		NA		1/Month	Calculated
TP – Calendar Year (mg/L)	9	0.3		NA		1/Year	Calculated
TN – Year to Date (mg/L)	8	NL		NA		1/Month	Calculated
TN – Calendar Year (mg/L)	9	3.0		NA		1/Year	Calculated
---	---	Minimum		Maximum		---	---
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.1		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,7,10	0.25		NA		1/Hour	Grab
Whole Effluent Toxicity (TU_c)	3,7,11	NA		1.56		1/Quarter***	24 HC

NL = No Limitation, monitoring required *NA = Not Applicable*
TIRE = Totalizing, Indicating, and Recording equipment *24 HC = 24-Hour Composite*
4/Month = 4 samples taken weekly during the calendar month

* = *Applicable only when chlorination is used for disinfection*
** = *Applicable if an alternative to chlorination is used for disinfection.*
*** = *Quarterly until there are a minimum of 4 consecutive quarters completed where the $TU_c = 1.0$. If 4 consecutive quarters are completed where the $TU_c = 1.0$, then annually during the period January-March.*

BASIS DESCRIPTIONS

1. *VPDES Permit Regulation (9 VAC 25-31)*
2. *Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)*
3. *Water Quality Standards (9 VAC 25-260)*
4. *Opequon Creek Capacity Study (DO Flow Model)*
5. *WQMP Regulation (9 VAC 25-720-50)*
6. *Opequon Creek TMDL Report*
7. *Best Professional Judgment (BPJ)*
8. *GM No. 07-2008, Amendment No. 2, 10/23/07, Permitting Considerations for Facilities in the Chesapeake Bay Watershed*
9. *Annual average concentration limits are based on the Technology Regulation (9 VAC 25-40)*
10. *FWSA 1991 chlorine disinfection performance demonstration*
11. *November 2005 Whole Effluent Toxicity Evaluation*

LIMITING FACTORS – OVERVIEW:
The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (9 VAC 25-720)	
A. TMDL limits	**E. coli, TSS**
B. Non-TMDL WLAs	**(c)BOD_5**
C. CBP (TN & TP) WLAs	**TN & TP via GP VAN010057**
Federal Effluent Guidelines	**(c)BOD_5, TSS, pH**
BPJ/Agency Guidance limits	**TRC (contact)**
Water Quality-based Limits - numeric	**(c)BOD_5, DO, TRC (effluent), E. coli, pH, Ammonia-N**
Water Quality-based Limits - narrative	**None**
Technology-based Limits (9 VAC 25-40-70)	**TN, TP**
Whole Effluent Toxicty (WET)	**Chronic (TU_c)**
Storm Water Limits	**Approved NEC**

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:
This discharge was modeled in 2005 by the owner's consultant engineer, HydroQual. The proprietary model DIURNAL was used for the evaluation and includes the existing 5.0 MGD Parkins Mills WWTF (VA0075191) and the historic Frederick County Landfill (VA0088471) discharges. The model begins upstream of the Parkins Mills WWTF discharge and continues approximately 14 miles downstream of the OWRF discharge, terminating at the confluence of Opequon Creek and Turkey Run in West Virginia. The model, which is titled Opequon Creek Capacity Study (OCCS), was reviewed and a stream inspection conducted at this reissuance. No abnormal conditions were noted during the stream inspection. A copy of the OCCS is maintained in the DEQ receiving stream DO model file. With the Frederick County Landfill now discharging to the OWRF, the model assumptions and results are deemed to conservatively reflect the in-stream conditions. Furthermore, the range of effluent flows and quality included in the OCCS in comparison to the actual permitted values, demonstrates the receiving stream can likely assimilate a slightly higher BOD wasteload. Based on these findings, the BOD and DO effluent requirements were carried forward at this reissuance. An additional model evaluation considering only the current permit conditions for the Parkins Mills WWTF and the OWRF is needed to more fully verify potential in-stream conditions and allow for future permitting in the Opequon Creek watershed. The permit requires this additional stream model simulation be submitted to DEQ by July 1, 2013.

In addition to the concentration limits, the Water Quality Management Plan for Opequon Creek restricts this discharge to 207 kg/d BOD_5 (Jun-Nov) and 1514 kg/d $cBOD_5$ (Dec-May). Because the WQMP specifies the dry season loading as BOD_5, and not $cBOD_5$, the concentration limit was also specified as BOD_5.

Based on the DO model Ammonia-N and Organic-N input values, it was determined that imposing only an Ammonia-N limit will adequately control the effluent TKN concentration. Ammonia-N was modeled at less than half the TKN concentration.

The monthly average TSS limit of 29 mg/L was back-calculated from the TMDL annual WLA of 5.0571×10^5 kg/yr. The TSS limits are more stringent than the Secondary Treatment Regulation and have been carried forward from the previous permit.

pH limits reflecting current WQC for Opequon Creek have been carried forward from the previous permit.

EVALUATION OF THE EFFLUENT – DISINFECTION:

The E. coli limit of 122 N/100 mL was back-calculated from the TMDL annual WLA of 2.12×10^{13} cfu/yr. This limit is protective of current WQC for E. coli in the receiving stream and has been carried forward from the previous permit. The FWSA completed an evaluation in 1991 demonstrating the facility could achieve adequate effluent disinfection with a chlorine contact tank TRC residual of 0.25 mg/L. This value has been applied as the chlorine contact tank TRC limit since the demonstration, as there are no data indicating recurrent inadequate disinfection. The limit was again carried forward at this reissuance along with the requirement of an increased monitoring frequency of 1/Hour. The permit also contains bacteria limitations to ensure effective disinfection is continually achieved.

EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with § 62.1-44.19:14.C.5. of the Code of Virginia, this Significant Discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for TN and Total Phosphorus (TP) Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9 VAC 25-820) (GP). The effective date of coverage is January 1, 2007. Coverage under the GP will expire December 31, 2011.

The load limit for TN is 121,851 pounds per calendar year and TP is 11,512 pounds per calendar year. These WLAs are based on a design flow of 12.6 MGD, effluent TN = 3.0 mg/L, effluent TP = 0.3 mg/L, and include the Frederick County Landfill TN WLA of 6,729 lbs/yr. The WLAs are updated from the values included in 9 VAC 25-720, and were awarded as a result of the Virginia Circuit Court of the City of Winchester Case No. CL09000407.00 Consent Decree, a copy of which is included in the permit reissuance file.

The Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed (9 VAC 25-40-70) stipulates the inclusion of technology-based effluent concentration limitations in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorous whether by new construction, expansion, or upgrade. Technology based annual average effluent concentration limits of TN = 3.0 mg/L and TP = 0.30 mg/L are required for the recently expanded and upgraded 12.6 MGD facility.

EVALUATION OF THE EFFLUENT – TOXICS:

WQS-WLA Spreadsheet Data

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 1AOPE036.13 on the Opequon Creek. A Flow Frequency Determination for the receiving stream was generated November 2, 2010, and is included in Appendix A. The "Wet Season" or "High Flow" months are December through May.

Table 1. Stream Information

90% Annual Temp (°C) =	22.1	90% pH (SU) =	8.5
90% Wet Temp (°C) =	16.8	10% pH (SU) =	7.8
Mean Hardness (mg/L) =	242		

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Discharge: The pH and temperature values were obtained from the daily operational data submitted by the permittee. The hardness value was conservatively set based on data provided by the permittee during the previous permit reissuance and the mean hardness value for Opequon Creek included in Table 1.

Table 2. Effluent Information

90% Annual Temp (°C) =	24.3	90% pH (SU) =	7.8
90% Wet Temp (°C) =	18.5	10% pH (SU) =	7.3
Mean Hardness (mg/L) =	250		

WQC and WLAs were calculated for Ammonia-N and TRC. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommends the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

? TRC: Effluent limits are required and are slightly more stringent than those required by the previous permit 12.6 MGD flow tier. This change is due to an increase in the monitoring frequency from 1/Day to 1/2 Hours, as specified by current DEQ Guidance. The OWRF includes a dechlorination system, and as such, no compliance schedule is needed to meet the new limit.

? Ammonia-N: The Ammonia-N toxicity evaluation resulted in limits that are more restrictive than those previously required. The changes are attributed to the slightly increased effluent pH and stream temperature values since the previous evaluation. However, at this reissuance the monthly average Ammonia-N permit limits were set based on the receiving stream DO model requirements, which are more restrictive than WQS toxicity criteria. The maximum weekly average Ammonia-N permit limits were set based on the WQS toxicity criteria. Based on the facility's Ammonia-N effluent data combined with the fact that it is now designed to meet an annual average TN limit of 3.0 mg/L, a compliance schedule is not needed to meet these more restrictive limits.

? A complete WQS toxics scan is required for the 12.6 MGD discharge. This data must be submitted by January 10, 2012 and must be reported using Attachment A of the permit.

PROTOCOL FOR THE EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic Waste Load Allocations (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health Waste Load Allocations (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh}, the WLA_{hh} was imposed as the limit. Since there is no data available immediately upstream of this discharge, all other upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is = the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

   B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
   B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

   C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
   C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
   C.3. If the evaluation indicates that limits are needed, but the metals data are reported as a form other than "Dissolved", then the existing data set is inadequate to make a determination and additional monitoring is required.

TOXLARGE

Parameter	CASRN	Type	QL (µg/L)	Data (µg/L unless noted otherwise)	Source of Data	Data Eval
Acenapthene	83-32-9	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Acrolein	107-02-8	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Acrylonitrile [C]	107-13-1	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Aldrin [C]	309-00-2	P	0.05	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Ammonia-N (mg/L) (Jun-Nov)	766-41-7	X	0.2 mg/L	**Default = 9 mg/L**	**b**	**C.2**
Ammonia-N (mg/L) (Dec-May)	766-41-7	X	0.2 mg/L	**Default = 9 mg/L**	**b**	**C.2**
Anthracene	120-12-7	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Antimony, dissolved	7440-36-0	M	0.2	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Arsenic, dissolved	7440-38-2	M	1.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Benzene [C]	71-43-2	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Benzidine [C]	92-87-5	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Benzo (a) anthracene [C]	56-55-3	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Benzo (b) fluoranthene [C]	205-99-2	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Benzo (k) fluoranthene [C]	207-08-9	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Benzo (a) pyrene [C]	50-32-8	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Bis2-Chloroethyl Ether [C]	111-44-4	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Bis2-Chloroisopropyl Ether	108-60-1	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Bis (2-ethylhexyl) Phthalate [C]	117-81-7	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Bromoform [C]	75-25-2	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Butylbenzylphthalate	85-68-7	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Cadmium, dissolved	7440-43-9	M	0.3	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Carbon Tetrachloride [C]	56-23-5	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chlordane [C]	57-74-9	P	0.2	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chloride (mg/L)	16887-00-6	X	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
TRC (mg/L)	7782-50-5	X	0.1 mg/L	**Default = 20 mg/L**	**b**	**C.2**
Chlorobenzene	108-90-7	V	50.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chlorodibromomethane [C]	124-48-1	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chloroform	67-66-3	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2-Chloronaphthalene	91-58-7	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2-Chlorophenol	95-57-8	A	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chlorpyrifos	2921-88-2	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chromium III, dissolved	16065-83-1	M	0.5	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chromium VI, dissolved	18540-29-9	M	0.5	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Chrysene [C]	218-01-9	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Copper, dissolved	7440-50-8	M	0.5	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Cyanide, Free	57-12-5	X	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
DDD [C]	72-54-8	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
DDE [C]	72-55-9	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
DDT [C]	50-29-3	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Demeton	8065-48-3	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Diazinon	333-41-5	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Dibenz(a,h)anthracene [C]	53-70-3	B	20.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,2-Dichlorobenzene	95-50-1	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---

Parameter	CASRN	Type	QL (µg/L)	Data (µg/L unless noted otherwise)	Source of Data	Data Eval
1,3-Dichlorobenzene	541-73-1	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,4-Dichlorobenzene	106-46-7	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
3,3-Dichlorobenzidine [C]	91-94-1	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Dichlorobromomethane [C]	75-27-4	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,2-Dichloroethane [C]	107-06-2	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,1-Dichloroethylene	75-35-4	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,2-trans-dichloroethylene	156-60-5	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2,4-Dichlorophenol	120-83-2	A	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,2-Dichloropropane [C]	78-87-5	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,3-Dichloropropene [C]	542-75-6	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Dieldrin [C]	60-57-1	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Diethyl Phthalate	84-66-2	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2,4-Dimethylphenol	105-67-9	A	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Dimethyl Phthalate	131-11-3	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Di-n-Butyl Phthalate	84-74-2	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2,4-Dinitrophenol	51-28-5	A	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2-Methyl-4,6-Dinitrophenol	534-52-1	A	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2,4-Dinitrotoluene [C]	121-14-2	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,2-Diphenylhydrazine [C]	122-66-7	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Alpha-Endosulfan (syn = Alpha-Endosulfan I)	959-98-8	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Beta-Endosulfan (syn = Alpha-Endosulfan II)	33213-65-9	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Alpha-Endosulfan + Beta-Endosulfan		P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Endosulfan Sulfate	1031-07-8	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Endrin	72-20-8	P	0.1	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Endrin Aldehyde	7421-93-4	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Ethylbenzene	100-41-4	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Fluoranthene	206-44-0	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Fluorene	86-73-7	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hardness (mg/L as $CaCO_3$)				Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Guthion	86-50-0	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Heptachlor [C]	76-44-8	P	0.05	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Heptachlor Epoxide [C]	1024-57-3	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hexachlorobenzene [C]	118-74-1	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hexachlorobutadiene [C]	87-68-3	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hexachlorocyclohexane Alpha-BHC [C]	319-84-6	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hexachlorocyclohexane Beta-BHC [C]	319-85-7	P	---	Sampling req'd within 1 year of 12.6 MGD CT O issuance	---	---
Hexachlorocyclohexane Gamma-BHC [C] (syn. = Lindane)	58-89-9	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hexachlorocyclopentadiene	77-47-4	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hexachloroethane [C]	67-72-1	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Hydrogen Sulfide	7783-06-4	X	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Indeno (1,2,3-cd) pyrene [C]	193-39-5	B	20.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Isophorone [C]	78-59-1	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Kepone	143-50-0	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---

Parameter	CASRN	Type	QL (µg/L)	Data (µg/L unless noted otherwise)	Source of Data	Data Eval
Lead, dissolved	7439-92-1	M	0.5	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Malathion	121-75-5	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Mercury, dissolved	7439-97-6	M	1.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Methyl Bromide	74-83-9	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Methylene Chloride [C]	75-09-2	V	20.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Methoxychlor	72-43-5	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Mirex	2385-85-5	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Nickel, dissolved	7440-02-0	M	0.5	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Nitrobenzene	98-95-3	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
N-Nitrosodimethylamine [C]	62-75-9	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
N-Nitrosodiphenylamine [C]	86-30-6	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
N-Nitrosodi-n-propylamine [C]	621-64-7	B	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Nonylphenol	104-40-51	A	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Parathion	56-38-2	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
PCB Total [C]	1336-36-3	p	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Pentachlorophenol [C]	87-86-5	A	50.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Phenol	108-95-2	A	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Pyrene	129-00-0	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Selenium, total recoverable	7782-49-2	M	2.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Silver, dissolved	7440-22-4	M	0.2	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,1,2,2-Tetrachloroethane [C]	79-34-5	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Tetrachloroethylene [C]	127-18-4	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Thallium, dissolved	7440-28-0	M	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Toluene	108-88-3	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Toxaphene [C]	8001-35-2	P	5.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Tributyltin	60-10-5	P	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,2,4-Trichlorobenzene	120-82-1	B	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
1,1,2-Trichloroethane [C]	79-00-5	V	---	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Trichloroethylene [C]	79-01-6	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
2,4,6-Trichlorophenol [C]	88-06-2	A	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Vinyl Chloride [C]	75-01-4	V	10.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---
Zinc, dissolved	7440-66-6	M	2.0	Sampling req'd within 1 year of 12.6 MGD CTO issuance	---	---

"Type" column indicates a category assigned to the referenced substance (see below):
A = Acid Extractable Organic Compounds
B = Base/Neutral Extractable Organic Compounds
M = Metals
p = PCBs
P = Pesticides
R = Radionuclides
V = Volatile Organic Compounds
X = Miscellaneous Compounds and Parameters

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5}.

"Source of Data" codes:
a = default effluent concentration

"Data Evaluation" codes:
See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

WQS-WLA SPREADSHEET INPUT

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name: Opequon Water Reclamation Facility
Receiving Stream: Opequon Creek
Permit No.: VA0065552
Date: 12/21/2010
Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	242	mg/L	1Q10 (Annual) =	0.71	MGD	Annual	- 1Q10 Flow =	87.53 %	Mean Hardness (as CaCO3) =	250	mg/L
90% Temperature (Annual) =	22.1	deg C	7Q10 (Annual) =	0.97	MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	24.3	deg C
90% Temperature (Wet season) =	16.8	deg C	30Q10 (Annual) =	1.42	MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =	18.5	deg C
90% Maximum pH =	8.5	SU	1Q10 (Wet season) =	2.00	MGD	Wet Season	- 1Q10 Flow =	83.83 %	90% Maximum pH =	7.8	SU
10% Maximum pH =	7.8	SU	30Q10 (Wet season) =	4.33	MGD		- 30Q10 Flow =	100 %	10% Maximum pH =	7.3	SU
Tier Designation =	1		30Q5 =	2.00	MGD				Current Discharge Flow =	12.6	MGD
Public Water Supply (PWS) Y/N? =	N		Harmonic Mean =	6.59	MGD				Discharge Flow for Limit Analysis =	12.6	MGD
V(alley) or P(iedmont)? =	V										
Trout Present Y/N? =	N										
Early Life Stages Present Y/N? =	Y										

Footnotes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQSs selected from separate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation (based on standards).
10. WLA = Waste Load Allocation (based on standards).
11. WLAs are based on mass balances (less background, if data exist).
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQS-WLA SPREADSHEET OUTPUT

Facility Name: Opequon Water Reclamation Facility
Permit No.: VA0065552
Receiving Stream: Opequon Creek
Date: 12/21/2010

WATER QUALITY CRITERIA
12.6 MGD Discharge Flow - Mix per "Mixer"

NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS
12.6 MGD Discharge - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health Public Water Supplies	Human Health Other Surface Waters	NAWLA Aquatic Protection Acute	NAWLA Aquatic Protection Chronic	NAWLA Human Health
Acenaphthene	N	None	None	6.7E+02	9.9E+02	N/A	N/A	1.1E+03
Acrolein	N	None	None	6.1E+00	9.3E+00	N/A	N/A	1.1E+01
Acrylonitrile	Y	None	None	5.1E-01	2.5E+00	N/A	N/A	3.8E+00
Aldrin	Y	3.0E+00	None	4.9E-04	5.0E-04	3.1E+00	N/A	7.6E-04
Ammonia-N (Annual)	N	1.2E+01 mg/L	1.6E+00 mg/L	None	None	1.2E+01 mg/L	1.8E+00 mg/L	N/A
Ammonia-N (Wet Season)	N	1.1E+01 mg/L	2.2E+00 mg/L	None	None	1.3E+01 mg/L	3.0E+00 mg/L	N/A
Anthracene	N	None	None	8.3E+03	4.0E+04	N/A	N/A	4.6E+04
Antimony	N	None	None	5.6E+00	6.4E+02	N/A	N/A	7.4E+02
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None	3.6E+02	1.6E+02	N/A
Benzene	Y	None	None	2.2E+01	5.1E+02	N/A	N/A	7.8E+02
Benzidine	Y	None	None	8.6E-04	2.0E-03	N/A	N/A	3.0E-03
Benzo(a)anthracene	Y	None	None	3.8E-02	1.8E-01	N/A	N/A	2.7E-01
Benzo(a)pyrene	Y	None	None	3.8E-02	1.8E-01	N/A	N/A	2.7E-01
Benzo(b)fluoranthene	Y	None	None	3.8E-02	1.8E-01	N/A	N/A	2.7E-01
Benzo(k)fluoranthene	Y	None	None	3.8E-02	1.8E-01	N/A	N/A	2.7E-01
Bis2-Chloroethyl Ether	Y	None	None	3.0E-01	5.3E+00	N/A	N/A	8.1E+00
Bis2-Chloroisopropyl Ether	N	None	None	1.4E+03	6.5E+04	N/A	N/A	7.5E+04
Bis2-Ethylehexyl Phthalate	Y	None	None	1.2E+01	2.2E+01	N/A	N/A	3.4E+01
Bromoform	Y	None	None	4.3E+01	1.4E+03	N/A	N/A	2.1E+03
Butyl Benzyl Phthalate	N	None	None	1.5E+03	1.9E+03	N/A	N/A	2.2E+03
Cadmium	N	1.1E+01	2.3E+00	5.0E+00	None	1.2E+01	2.5E+00	N/A
Carbon Tetrachloride	Y	None	None	2.3E+00	1.6E+01	N/A	N/A	2.4E+01
Chlordane	Y	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.5E+00	4.6E-03	1.2E-02
Chloride	N	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None	9.0E+02 mg/L	2.5E+02 mg/L	N/A
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	2.0E-02 mg/L	1.2E-02 mg/L	N/A
Chlorobenzene	N	None	None	1.3E+02	1.6E+03	N/A	N/A	1.9E+03
Chlorodibromomethane	Y	None	None	4.0E+00	1.3E+02	N/A	N/A	2.0E+02
Chloroform	N	None	None	3.4E+02	1.1E+04	N/A	N/A	1.3E+04
2-Chloronaphthalene	N	None	None	1.0E+03	1.6E+03	N/A	N/A	1.9E+03
2-Chlorophenol	N	None	None	8.1E+01	1.5E+02	N/A	N/A	1.7E+02
Chlorpyrifos	N	8.3E-02	4.1E-02	None	None	8.7E-02	4.4E-02	N/A
Chromium (+3)	N	1.2E+03	1.6E+02	None	None	1.3E+03	1.7E+02	N/A
Chromium (+6)	N	1.6E+01	1.1E+01	None	None	1.7E+01	1.2E+01	N/A
Chrysene	Y	None	None	4.4E-02	4.9E-01	N/A	N/A	7.5E-01
Copper	N	3.2E+01	2.0E+01	1.3E+03	None	3.3E+01	2.1E+01	N/A
Cyanide, Free	N	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.3E+01	5.6E+00	1.9E+04
DDD	Y	None	None	3.1E-03	3.1E-03	N/A	N/A	4.7E-03
DDE	Y	None	None	2.2E-03	2.2E-03	N/A	N/A	3.4E-03
DDT	Y	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.2E+00	1.1E-03	3.4E-03
Demeton	N	None	1.0E-01	None	None	N/A	1.1E-01	N/A
Diazinon	N	1.7E-01	1.7E-01	None	None	1.8E-01	1.8E-01	N/A
Dibenz(a,h)anthracene	Y	None	None	3.8E-02	1.8E-01	N/A	N/A	2.7E-01
1,2-Dichlorobenzene	N	None	None	4.2E+02	1.3E+03	N/A	N/A	1.5E+03
1,3-Dichlorobenzene	N	None	None	3.2E+02	9.6E+02	N/A	N/A	1.1E+03
1,4-Dichlorobenzene	N	None	None	6.3E+01	1.9E+02	N/A	N/A	2.2E+02
3,3-Dichlorobenzidine	Y	None	None	2.1E-01	2.8E-01	N/A	N/A	4.3E-01
Dichlorobromomethane	Y	None	None	5.5E+00	1.7E+02	N/A	N/A	2.6E+02
1,2-Dichloroethane	Y	None	None	3.8E+00	3.7E+02	N/A	N/A	5.6E+02
1,1-Dichloroethylene	N	None	None	3.3E+02	7.1E+03	N/A	N/A	8.2E+03
1,2-trans-dichloroethylene	N	None	None	1.4E+02	1.0E+04	N/A	N/A	1.2E+04
2,4-Dichlorophenol	N	None	None	7.7E+01	2.9E+02	N/A	N/A	3.4E+02
1,2-Dichloropropane	Y	None	None	5.0E+00	1.5E+02	N/A	N/A	2.3E+02
1,3-Dichloropropene	Y	None	None	3.4E+00	2.1E+02	N/A	N/A	3.2E+02
Dieldrin	Y	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.5E-01	6.0E-02	8.2E-04
Diethyl Phthalate	N	None	None	1.7E+04	4.4E+04	N/A	N/A	5.1E+04
2,4 Dimethylphenol	N	None	None	3.8E+02	8.5E+02	N/A	N/A	9.8E+02
Dimethyl Phthalate	N	None	None	2.7E+05	1.1E+06	N/A	N/A	1.3E+06
Di-n-Butyl Phthalate	N	None	None	2.0E+03	4.5E+03	N/A	N/A	5.2E+03
2,4 Dinitrophenol	N	None	None	6.9E+01	5.3E+03	N/A	N/A	6.1E+03
2-Methyl-4,6-Dinitrophenol	N	None	None	1.3E+01	2.8E+02	N/A	N/A	3.2E+02
2,4-Dinitrotoluene	Y	None	None	1.1E+00	3.4E+01	N/A	N/A	5.2E+01
1,2-Diphenylhydrazine	Y	None	None	3.6E-01	2.0E+00	N/A	N/A	3.0E+00

Facility Name:	Permit No.:	WATER QUALITY CRITERIA 12.6 MGD Discharge Flow - Mix per "Mixer"				NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS 12.6 MGD Discharge - Mix per "Mixer"		
Opequon Water Reclamation Facility	VA0065552							
Receiving Stream:	Date:			Human Health				
Opequon Creek	12/21/2010	Aquatic Protection		Public Water	Other Surface	Aquatic Protection		Human
Toxic Parameter and Form	Carcinogen?	Acute	Chronic	Supplies	Waters	Acute	Chronic	Health
Alpha-Endosulfan	N	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.3E-01	6.0E-02	1.0E+02
Beta-Endosulfan	N	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.3E-01	6.0E-02	1.0E+02
Alpha+Beta-Endosulfan	N	2.2E-01	5.6E-02	None	None	2.3E-01	6.0E-02	N/A
Endosulfan Sulfate	N	None	None	6.2E+01	8.9E+01	N/A	N/A	1.0E+02
Endrin	N	8.6E-02	3.6E-02	5.9E-02	6.0E-02	9.0E-02	3.9E-02	7.0E-02
Endrin Aldehyde	N	None	None	2.9E-01	3.0E-01	N/A	N/A	3.5E-01
Ethylbenzene	N	None	None	5.3E+02	2.1E+03	N/A	N/A	2.4E+03
Fluoranthene	N	None	None	1.3E+02	1.4E+02	N/A	N/A	1.6E+02
Fluorene	N	None	None	1.1E+03	5.3E+03	N/A	N/A	6.1E+03
Guthion	N	None	1.0E-02	None	None	N/A	1.1E-02	N/A
Heptachlor	Y	5.2E-01	3.8E-03	7.9E-04	7.9E-04	5.5E-01	4.1E-03	1.2E-03
Heptachlor Epoxide	Y	5.2E-01	3.8E-03	3.9E-04	3.9E-04	5.5E-01	4.1E-03	5.9E-04
Hexachlorobenzene	Y	None	None	2.8E-03	2.9E-03	N/A	N/A	4.4E-03
Hexachlorobutadiene	Y	None	None	4.4E+00	1.8E+02	N/A	N/A	2.7E+02
Hexachlorocyclohexane Alpha-BHC	Y	None	None	2.6E-02	4.9E-02	N/A	N/A	7.5E-02
Hexachlorocyclohexane Beta-BHC	Y	None	None	9.1E-02	1.7E-01	N/A	N/A	2.6E-01
Hexachlorocyclohexane Gamma-BHC (Lindane)	Y	9.5E-01	None	9.8E-01	1.8E+00	1.0E+00	N/A	2.7E+00
Hexachlorocyclopentadiene	N	None	None	4.0E+01	1.1E+03	N/A	N/A	1.3E+03
Hexachloroethane	Y	None	None	1.4E+01	3.3E+01	N/A	N/A	5.0E+01
Hydrogen Sulfide	N	None	2.0E+00	None	None	N/A	2.2E+00	N/A
Indeno(1,2,3-cd)pyrene	Y	None	None	3.8E-02	1.8E-01	N/A	N/A	2.7E-01
Isophorone	Y	None	None	3.5E+02	9.6E+03	N/A	N/A	1.5E+04
Kepone	N	None	Zero	None	None	N/A	Zero	N/A
Lead	N	3.8E+02	4.3E+01	1.5E+01	None	4.0E+02	4.7E+01	N/A
Malathion	N	None	1.0E-01	None	None	N/A	1.1E-01	N/A
Mercury	N	1.4E+00	7.7E-01	None	None	1.5E+00	8.3E-01	N/A
Methyl Bromide	N	None	None	4.7E+01	1.5E+03	N/A	N/A	1.7E+03
Methylene Chloride	Y	None	None	4.6E+01	5.9E+03	N/A	N/A	9.0E+03
Methoxychlor	N	None	3.0E-02	1.0E+02	None	N/A	3.2E-02	N/A
Mirex	N	None	Zero	None	None	N/A	Zero	N/A
Nickel	N	4.0E+02	4.4E+01	6.1E+02	4.6E+03	4.1E+02	4.7E+01	5.3E+03
Nitrobenzene	N	None	None	1.7E+01	6.9E+02	N/A	N/A	8.0E+02
N-Nitrosodimethylamine	Y	None	None	6.9E-03	3.0E+01	N/A	N/A	4.6E+01
N-Nitrosodiphenylamine	Y	None	None	3.3E+01	6.0E+01	N/A	N/A	9.1E+01
N-Nitrosodi-n-propylamine	Y	None	None	5.0E-02	5.1E+00	N/A	N/A	7.8E+00
Nonylphenol	N	2.8E+01	6.6E+00	None	None	2.9E+01	7.1E+00	N/A
Parathion	N	6.5E-02	1.3E-02	None	None	6.8E-02	1.4E-02	N/A
PCB Total	Y	None	1.4E-02	6.4E-04	6.4E-04	N/A	1.5E-02	9.7E-04
Pentachlorophenol	Y	1.2E+01	9.2E+00	2.7E+00	3.0E+01	1.3E+01	1.0E+01	4.6E+01
Phenol	N	None	None	1.0E+04	8.6E+05	N/A	N/A	1.0E+06
Pyrene	N	None	None	8.3E+02	4.0E+03	N/A	N/A	4.6E+03
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.1E+01	5.4E+00	4.9E+03
Silver	N	1.7E+01	None	None	None	1.7E+01	N/A	N/A
1,1,2,2-Tetrachloroethane	Y	None	None	1.7E+00	4.0E+01	N/A	N/A	6.1E+01
Tetrachloroethylene	Y		None	6.9E+00	3.3E+01	0.0E+00	N/A	5.0E+01
Thallium	N	None	None	2.4E-01	4.7E-01	N/A	N/A	5.4E-01
Toluene	N	None	None	5.1E+02	6.0E+03	N/A	N/A	7.0E+03
Toxaphene	Y	7.3E-01	2.0E-04	2.8E-03	2.8E-03	7.7E-01	2.2E-04	4.3E-03
Tributyltin	N	4.6E-01	7.2E-02	None	None	4.8E-01	7.8E-02	N/A
1,2,4-Trichlorobenzene	N	None	None	3.5E+01	7.0E+01	N/A	N/A	8.1E+01
1,1,2-Trichloroethane	Y	None	None	5.9E+00	1.6E+02	N/A	N/A	2.4E+02
Trichloroethylene	Y	None	None	2.5E+01	3.0E+02	N/A	N/A	4.6E+02
2,4,6-Trichlorophenol	Y	None	None	1.4E+01	2.4E+01	N/A	N/A	3.7E+01
Vinyl Chloride	Y	None	None	2.5E-01	2.4E+01	N/A	N/A	3.7E+01
Zinc	N	2.5E+02	2.6E+02	7.4E+03	2.6E+04	2.7E+02	2.8E+02	3.0E+04

REDUCED MONITORING EVALUATION

The OWRF is required to meet relatively low Ammonia-N limits, as well as an annual TN limit of 3.0 mg/L. This level of Ammonia-N and TN removal dictates rigorous process control with substantial, and potentially full, biological consumption of available cBOD. At this reissuance, the facility's pre and post ENR upgrade BOD data was reviewed. The data overwhelming demonstrate this facility predictably reduces the effluent BOD below the DEQ quantification level of 5 mg/L. Given the low Ammonia-N limits relative to the BOD effluent requirements, reduced BOD monitoring is warranted. The permit requires BOD_5 (Jun-Nov) be monitored 3 Days/Week; the previous permit required 1/Day monitoring. The effluent $cBOD_5$ (Dec-May) will continue to be monitored 1/Week, as required by the previous permit.

STAT.EXE RESULTS:

Chemical = Ammonia-N, Jun-Nov	Chemical = Ammonia-N, Dec-May	Chemical = TRC
Chronic averaging period = 30	Chronic averaging period = 30	Chronic averaging period = 4
WLAa = 12	WLAa = 13	WLAa = 0.02
WLAc = 1.8	WLAc = 3.0	WLAc = 0.012
Q.L. = 0.2	Q.L. = 0.2	Q.L. = 0.1
# samples/mo. = 30	# samples/mo. = 30	# samples/mo. = 360
# samples/wk. = 7	# samples/wk. = 7	# samples/wk. = 84
Summary of Statistics:	Summary of Statistics:	Summary of Statistics:
# observations = 1	# observations = 1	# observations = 1
Expected Value = 9	Expected Value = 9	Expected Value = 20
Variance = 29.16	Variance = 29.16	Variance = 144
C.V. = 0.6	C.V. = 0.6	C.V. = 0.6
97th percentile daily values = 21.9007	97th percentile daily values = 21.9007	97th percentile daily values = 48.6683
97th percentile 4 day average = 14.9741	97th percentile 4 day average = 14.9741	97th percentile 4 day average = 33.2758
97th percentile 30 day average= 10.8544	97th percentile 30 day average= 10.8544	97th percentile 30 day average= 24.1210
# < Q.L. = 0	# < Q.L. = 0	# < Q.L. = 0
Model used = BPJ Assumptions, type 2 data	Model used = BPJ Assumptions, type 2 data	Model used = BPJ Assumptions, type 2 data
A limit is needed based on Chronic Toxicity	A limit is needed based on Chronic Toxicity	A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 3.63180616814936	Maximum Daily Limit = 6.05301028024893	Maximum Daily Limit = 1.75508974086388E-02
Average Weekly limit = 2.21797020041528	**Average Weekly limit = 3.69661700069214**	**Average Weekly limit = 8.13909399503221E-03**
Average Monthly Limit = 1.8	**Average Monthly Limit = 3.0**	**Average Monthly Limit = 7.64146204473373E-03**
The data are: 9	The data are: 9	The data are: 20

WHOLE EFFLUENT TOXICITY (WET) EVALUATION:

Per DEQ Guidance Memo #00-2012, this discharge requires WET monitoring, because it is a municipal sewage treatment plant with a design flow greater than 1 MGD and it has a pretreatment program.

The WET evaluation conducted during the previous reissuance (November 2005) indicated a WET limit was required for this discharge. Limits were established for the existing and expanded flow tiers at that time. The facility received a CTO in December 2010, at which point the 12.6 MGD facility WET limit became effective. At the time of this evaluation there are no WET data for the 12.6 MGD discharge, and the previous limit has been carried forward based on Antibacksliding requirements. Continued quarterly chronic WET monitoring is required in accordance with DEQ guidance memo GM00-2012. The permit includes the option to reduce to annual monitoring after four consecutive quarters demonstrating no toxicity ($TU_c = 1.0$). The permit also allows DEQ to require acute toxicity monitoring should the chronic 48-HR LC_{50} data indicate potential acute toxicity.

For reference, paraphrased language specific to the 12.6 MGD discharge and pertinent data results from the November 2005 WET evaluation are provided below:

The results from nine semi-annual monitoring tests were evaluated using the procedures outlined in the DEQ Guidance Memo #00-2012. Based on the evaluation, a chronic WET limit (TU_c) is required. When discharge and stream flow conditions result in a high Instream Waste Concentration, a limit may be required if the WET monitoring data result in an average TU_c exceeding 1.0. The TU_c is considered a maximum and is how the results are to be reported on the DMR. Testing will be required on a quarterly basis. There was no need to perform calculations for the acute data since all the NOAECs were 100% (i.e. the mean of the data does not exceed a TU_a of 1.0). No acute WET limit or monitoring are required. Since the future chronic test data can be assessed to some degree for the presence of acute toxicity, the permit can be modified to include acute monitoring or an acute WET limit if necessary. Should further information clearly indicate the cause of toxicity for this discharge, a pollutant specific effluent limitation can be used in lieu of a WET limit. The permittee is required to complete their first quarterly test within the calendar quarter that is six months from the date of issuance of the 12.6 MGD CTO. Per DEQ guidance and the EPA Form 2A permit application requirements, testing will require two species, Ceriodaphnia dubia and Pimephales promelas. The chronic WET limit is listed below, along with the recommended dilution series:

Flow Tier (MGD)	*WET Limit (TUc)*	*NOEC*	*Recommended Dilution Series*	*Limit effective*
12.6	*1.56*	*≥ 64%*	*100, 80, 64, 51.2, 41%*	*December 28, 2010*

WET STAT.EXE RESULTS

Chemical = TUc - Minnow	*Chemical = TUc - Water Flea*
Chronic averaging period = 4	*Chronic averaging period = 4*
WLAa = 3.1479674	*WLAa = 3.1479674*
WLAc = 1.0769841	*WLAc = 1.0769841*
Q.L. = 1	*Q.L. = 1*
# samples/mo. = 1	*# samples/mo. = 1*
# samples/wk. = 1	*# samples/wk. = 1*
Summary of Statistics:	*Summary of Statistics:*
# observations = 9	*# observations = 9*
Expected Value = 1.19888	*Expected Value = 1.06777*
Variance = .517440	*Variance = .410453*
C.V. = 0.6	*C.V. = 0.6*
97th percentile daily values = 2.91739	*97th percentile daily values = 2.59834*
97th percentile 4 day average = 1.99469	*97th percentile 4 day average = 1.77655*
97th percentile 30 day average= 1.44592	*97th percentile 30 day average= 1.28779*
# < Q.L. = 0	*# < Q.L. = 0*
Model used = BPJ Assumptions, type 2 data	*Model used = BPJ Assumptions, type 2 data*
A limit is needed based on Chronic Toxicity	*A limit is needed based on Chronic Toxicity*
Maximum Daily Limit = 1.57516978748626	*Maximum Daily Limit = 1.57516978748626*
Average Weekly limit = 1.57516978748626	*Average Weekly limit = 1.57516978748626*
Average Monthly Limit = 1.57516978748626	*Average Monthly Limit = 1.57516978748626*
The data are:1,1,1,1,1.23,2.56,1,1,1	*The data are: 1,1.61,1,1,1,1,1,1,1*

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE 100% = NOAEC — LC_{50} = NA % Use as NA TUa

ACUTE WLAa 0.3147967 Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	1.57516972	TU_c	NOEC =	64 %	Use as 1.56	TU_c
BOTH*	3.14796746	TU_c	NOEC =	32 %	Use as 3.12	TU_c
AML	1.57516972	TU_c	NOEC =	64 %	Use as 1.56	TU_c

ACUTE WLAa,c 3.1479674
CHRONIC WLAc 1.0769841
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.0 a limit may result using WLA.EXE

Enter data in the cells with blue type:

Entry Date: 11/16/05
Facility Name:
VPDES Number: VA0065552
Outfall Number: 001

Plant Flow: 12.6 MGD
Acute 1Q10: 0.71 MGD
Chronic 7Q10: 0.97 MGD

% Flow to be used from MIX.EXE: 87.53 % / 100 %

Difuser /modeling study? Enter Y/N: N
Acute 1 :1
Chronic 1 :1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

IWC_a	95.29958977 %	Plant flow/plant flow + 1Q10
IWC_c	92.85187915 %	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	1.04932246	100/IWCa
Dilution, chronic	1.076984127	100/IWCc

WLA_a	0.314796738	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.076984127	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	3.147967381	ACR X's WLA_a - converts acute WLA to chronic units

ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variatio	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp) No. of sample 1

"The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	1.293640511	WLAa,c X's eA					
LTA_c	0.647307632	WLAc X's eB				Rounded NOEC's	%
MDL** with $LTA_{a,c}$	3.147967458	TU_c	NOEC =	31.766529	(Protects from acute/chronic toxicity)	NOEC =	32 %
MDL** with LTA_c	1.575169719	TU_c	NOEC =	63.485222	(Protects from chronic toxicity)	NOEC =	64 %
AML with lowest LTA	1.575169719	TU_c	NOEC =	63.485222	Lowest LTA X's eD	NOEC =	64

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

						Rounded LC50's	%
MDL with $LTA_{a,c}$	0.314796746	TU_a	LC50 =	317.665291 %	Use NOAEC=100%	LC50 = NA	%
MDL with LTA_c	0.157516972	TU_a	LC50 =	634.852224 %	Use NOAEC=100%	LC50 = NA	

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			64	1.5625
Dilution factor to recommend:	0.5		0.8	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	80.0	1.25
	25.0	4.00	64.0	1.56
	12.5	8.00	51.2	1.95
	6.25	16.00	41.0	2.44
Extra dilutions if needed	3.12	32.05	32.8	3.05
	1.56	64.10	26.2	3.81

APPENDIX C

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page
- Content and format as prescribed by the VPDES Permit Manual.

Part I.A.1. **Effluent Limitations and Monitoring Requirements:**
Updates Part I.A.4. of the previous permit with the following:
- Changes were made to the format and introductory language.
- The BOD_5 limit was adjusted to 7 mg/L to reflect laboratory testing precision, which subsequently results in a change in the weekly max limit from 11 mg/L to 10 mg/L. At 10 mg/L, the weekly max load limit then becomes 480 kg/d. Previously, the load limit was 520 mg/L. The BOD_5 monitoring frequency was reduced to 3 Days/Week.
- More stringent TRC limits were included. The TRC monitoring frequency was increased to 1/2 Hours.
- More stringent Ammonia-N limits were included.
- E. coli monitoring was included in addition to the TRC monitoring.
- TKN, Nitrate+Nitrite, TN, Orthophosphate, and TP monitoring, along with the TN and TP Calendar Year load limits, were removed since they are reported under the permittee's VPDES GP coverage (VAN010057).
- The WET limit monitoring frequency was updated
- Footnotes were updated to reflect current DEQ guidance and changes in the reissued permit.

Part I.B. **Additional TRC Limitations and Monitoring Requirements:** *Updates Part I.B. of the previous permit.* E. coli monitoring frequency was changed to 1/Day per DEQ Guidance. Required by Sewage Collection and Treatment (SCAT) Regulations and 9 VAC 25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

Part I.C. **Effluent Limitations and Monitoring Requirements – Additional Instructions:** *Updates Part I.D. of the previous permit*. TKN, TP, Orthophosphate, and Nitrate-Nitrite were deleted. Paragraph added regarding significant digits. Authorized by VPDES Permit Regulation, 9 VAC 25-31-190.J.4 and 220.I. This condition is necessary when a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

Nutrient reporting calculations were updated. §62.1 44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70. As annual concentrations are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

Part I.D. **Pretreatment Program Requirements:** *Identical to Part I.E. of the previous permit.* VPDES Permit Regulation, 9 VAC 25-31-730 through 900, and 40 CFR part 403 require certain existing and new sources of pollution to meet specified regulations.

Part I.E. **Whole Effluent Toxicity (WET) Requirements:** *Updates Part I.F. of the previous permit*. VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act.

Part I.F.1. **95% Capacity Reopener:** *Identical to Part I.G.1. of the previous permit*. Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 4 for certain permits.

Part I.F.2 **Indirect Dischargers:** *Identical to Part I.G.2. of the previous permit.* Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 1 for all STPs that receive waste from someone other than the owner of the treatment works.

Part I.F.3. **Materials Handling/Storage:** *Identical to Part I.G.3. of the previous permit***.** 9 VAC 25-31-280.B.2. requires that the types and quantities of "wastes, fluids, or pollutants which are … treated, stored, etc." be addressed for all permitted facilities.

Part I.F.4. **O&M Manual Requirement:** *Updates Part I.G.5. of the previous permit.* Required by Code of Virginia 62.1-44.19, SCAT Regulations 9 VAC 25-790, and VPDES Permit Regulation 9 VAC 25-31-190 E for all STPs. Added requirement to describe procedures for documenting compliance with the permit requirement that there shall be no discharge of floating solids or visible foam in other than trace amounts.

Part I.F.5. **CTC/CTO Requirement:** *Updates Part I.G.4. of the previous permit.* Required by Code of Virginia 62.1-44.19, SCAT Regulations 9 VAC 25-790, and VPDES Permit Regulation 9 VAC 25-31-190 E for all STPs.

Part I.F.6. **SMP Requirement:** *Updates Part I.G.7. of the previous permit.* VPDES Permit Regulation 9 VAC 25-31-100 P, 220 B 2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements are derived from the Virginia Pollution Abatement Permit Regulation (9 VAC 25-32-10 *et seq*.)

Part I.F.7. **Licensed Operator Requirement:** *Identical to Part I.G.8. of the previous permit.* The VPDES Permit Regulation 9 VAC 25-31-200 C, the Code of Virginia 54.1-2300 et seq., and Rules and Regulations for Waterworks and Wastewater Works Operators 18 VAC 160-20-10 et seq., require licensure of operators. A Class I license is indicated for the 12.6 MGD facility.

Part I.F.8. **Reliability Class:** *Identical to Part I.G.9. of the previous permit.* Required by SCAT Regulations 9 VAC 25-790. Class II status was recommended for the 12.6 MGD facility.

Part I.F.9. **Water Quality Criteria Monitoring:** *Updates Part I.G.10. of the previous permit.* State Water Control Law at 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

Part I.F.10. **Treatment Works Closure Plan:** *Updates Part I.G.16. of the previous permit.* Required for all STPs, per State Water Control Law at 62.1-44.19. A treatment works closure plan is required where the facility is being replaced or is expected to close.

Part I.F.11. **Reopeners:**

a. *New Requirement*: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

b. *Updates Part I.G.12. of the previous permit:* 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.
c. *New Requirement:* 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

d. *Updates Part I.G.6. of the previous permit:* Required by the VPDES Permit Regulation, 9 VAC 25-31-220.C, for all permits issued to STPs.

Part I.F.12. **Suspension of concentration limits for E3/E4 facilities:** *New Requirement.* 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

Part I.F.13 *New Requirement.* An additional model evaluation considering only the current permit conditions for the Parkins Mills WWTF (VA0075191) and the OWRF is needed to more fully verify potential in-stream conditions and allow for future permitting in the Opequon Creek watershed.

Part II **Conditions Applicable to All VPDES Permits:** *Identical to Part II of previous permit.* VPDES Permit Regulation 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

DELETIONS

Tabulated below are the sections of the previous permit that were deleted and the basis for this action.

Parts I.A.2.-4. **Effluent Limitations and Monitoring Requirements:** The additional flow tiers are no longer needed since the facility has received a CTO for the 12.6 MGD facility.

Part I.C.1. & 2. **Schedule of Compliance (SOC):** The TP and TN WLA SOC was superseded by the permittee gaining coverage under the nutrient GP. With the 12.6 MGD facility CTO issuance, the WET limit SOC is no longer applicable and was removed at this reissuance.

Part I.G.11. The expanded and upgraded facility is designed to meet the TN and TP WLAs assigned in the Virginia Circuit Court of the City of Winchester Case No. CL09000407.00 Consent Decree, eliminating the need to offset excess nutrient loads.

Part I.G.13. **General Permit Controls**: The permit now has coverage under the nutrient GP.

Parts I.G.14. & 15. **Basis of Design for Nutrient Removal & Interim Optimization Plan for Nutrient Removal:** These requirements were superseded by the permittee gaining coverage under the nutrient GP.